Los geminivirus que atacan al frijol común (*Phaseolus vulgaris* L.) en el noroeste de México

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El mosaico dorado ha sido observado en el Estado de Sinaloa desde la década de los 70. En 1981, Morales confirmó la presencia del mosaico dorado en el Estado pero como parte de un complejo viral. En 1990. Brown *et al*., describieron un virus que causaba mosaico intenso y enanismo del frijol. A esta enfermedad se le dio el nombre de 'mosaico calico' y al virus bean calico mosaic (BCMoV). Plantas afectadas tenían partículas virales geminadas, y el ADN hibridizó con sondas preparadas para el virus del mosaico dorado de Puerto Rico (PR) (Brown *et al*., 1990). El propósito de este trabajo es el de conocer si el BCMoV pertenece al grupo I o II del BGMV o si es un geminivirus diferente.

Seguidamente se secuenciaron las regiones comunes del ADN-A y ADN-B del BCMoV, encontrándose que eran 91% idénticas y que, por lo tanto pertenecían al mismo virus. Las secuencias del gen AC1 (replicación?) y de la región común del BCMoV resultaron más similares a la secuencia del geminivirus del enrollamiento foliar de la calabaza descrito en California (SqLCV), (Lazarowitz y Lazdins, 1991) y de un geminivirus que ataca el tomate en Guatemala (M.K. Nakhla *et al*., unpublished). El BCMoV es distinto del BGMV tipo I y II (Gilbertson *et al*., 1993) y del BDMV de Colombia (Hydayat *et al*., 1993).

Se construyó un árbol filogenético con la secuencia de la región común de ocho geminiviruses que representa cuatro grupos de geminivirus del hemisferio occidental (Fig. 1). Este árbol presenta al BCMoV y al SqLCV juntos en un grupo diferente del correspondiente al tipo I y II del BGMV, y del virus del mosaico del Abutilon (que contiene al BDMV) (Faria *et al*., 1994).

En conclusión, es aparente que el frijol común en el noroeste mexicano es atacado por geminivirus diferentes al BGMV.

Traducción: Francisco J. Morales - Unidad de Virología - CIAT

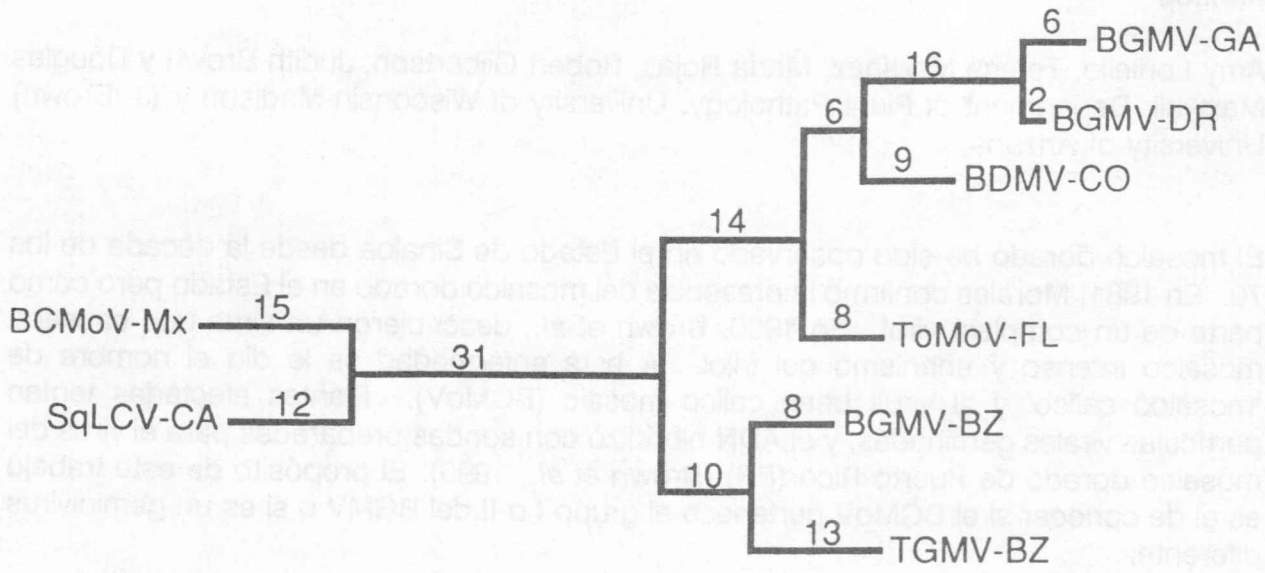

Fig. 1. A phylogenetic tree was constructed using the PAUP program to compare the Common Regions of the same eight geminiviruses used to construct the AL1 ORF phylogenetic tree (Fig.

The number of nucleotide differences between the different geminiviruses is shown above each branch of the tree. BCMoV and SqLCV are more closely related to each other than to any of the other geminiviruses.

Fig. 1 Este árbol filogenético se construyó según el programa para computador PAUP, para comparar la región común de ocho geminivirus: el virus del mosaico dorado del frijol (BGMV) de Guatemala (GA), República Dominicana (DR) y Brasil (BZ); el virus del mosaico enano del frijol (BDMV) de Colombia; el del moteado del tomate de Florida (ToMoV-FL); el del mosaico dorado del tomate de Brasil (TGMV-BZ); el del mosaico cálico del frijol de México (BCMoV-Mx); y el geminivirus del enrollamiento foliar de la calabaza (SqLCV-CA) de California, USA. El número de diferencias en los nucleótidos de los geminivirus analizados, se encuentra sobre cada 'rama' del árbol filogenético.

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English Summary

Bean-Infecting Geminiviruses from Northern Mexico

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Bean plants exhibiting golden mosaic symptoms typical of a geminivirus were observed by Galvez in January 1979 in the state of Sinaloa, N.W. Mexico. Brown *et al.*, (1990)

described a whitefly-transmitted geminivirus causing both bright mosaic and stunting symptoms in beans in the neighboring state of Sonora, Mexico, and tentatively named the virus "bean calico mosaic virus" (BCMoV). DNA extracted from calico-affected beans hybridized with viral probes from bean golden mosaic geminivirus.

The double-stranded replicative form of BCMoV was extracted from infected beans and cloned. The common regions of the cloned DNA-A fragment and cloned DNA-B were sequenced and compared with each other. The common regions were found to be 91% identical, indicating that the DNA-A and DNA-B clones are from the same virus. Sequences of BCMoV were most similar to that of squash leaf curl geminivirus from California and a tomato-infecting geminivirus from Guatemala and distinct from BGMV type I and type II and bean dwarf mosaic geminivirus from Colombia.

In a subsequent investigation in the Valle del Fuerte, Sinaloa, Mexico, two bean-infecting geminiviruses were found. Different DNA-B sizes amplified from different bean plants indicated that two geminiviruses were present. The DNA-A fragment amplified from bean 31 has 94% DNA sequence identity to BCMoV AC1, and the DNA-A fragment amplified from bean 36 has 95% DNA sequence identity to tomato leaf crumple virus AC1.

Preliminary results suggest that BCMoV occurs in at least two places in Mexico and that another geminivirus similar to TLCrV may also present in beans in Sinaloa, Mexico.